

# PATENT SPECIFICATION

DRAWINGS ATTACHED

838,800



*Date of Application and filing Complete Specification:*  
April 11, 1958.

*No.* 11507/58.

*Application made in United States of America on*  
April 17, 1957.

*Complete Specification Published June 22, 1960.*

*Index at Acceptance:* Classes 19, J; and 81(2), Q.  
*International Classification:* A46b, A61h.

## Dispenser-applicator for liquid containers.

### COMPLETE SPECIFICATION

I, ALEXANDER NADAI, of 419, West 119th Street, New York 27, New York, United States of America; a citizen of the United States of America, formerly a citizen of Hungary, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 This invention concerns liquid dispensers and has particular relation to a dispensing means for liquid containers adapted to apply a controlled amount of the liquid to a selected area of the body upon direct rubbing application of the dispenser to the skin or other surface.

15 In the application of cosmetic products and the like to the skin, an essential consideration in many instances is the dispensing of the product to very small skin areas in controlled quantities. This is particularly important in the use of such cosmetics as colognes and perfumes, deodorants, shaving lotions, and the like. In this connection, control in the application of such products has been attempted by making the product in solid stick, paste or cream form. This has the disadvantage of providing a product the major volume of which constitutes filler material or inert hardening material, which is wasteful in manufacture. In addition, the product cannot be properly controlled in its application and is invariably applied in too thick layers. In the case of deodorants, this is particularly disadvantageous, since too thick an application induces a physiological problem, tending to clog the sweat glands.

20 An object of the present invention is the provision of a liquid applicator in the nature of an insert for insertion into the mouth of a bottle containing the liquid to be dispensed, the applicator being constructed to serve as a closure for the bottle and to dispense a small, regulated amount of liquid in the desired quantity.

(Price 3s. 6d.)

According to the present invention a dispensing means comprises a porous reservoir member adapted to be mounted on a container and adapted to be saturated with liquid therefrom, a flexible, resilient and liquid permeable applicator membrane, which is mounted in spaced, confronting relation to the reservoir member, being adapted to be depressible into abutment with the reservoir member upon application of the dispensing means to a surface.

The invention will be described further, by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is an exploded elevation of the applicator insert in accordance with the invention, the insert body being shown in its original form before the porous disc and membrane are inserted;

Fig. 2 is a vertical section through a portion of a bottle containing the assembled applicator, the bottle being shown in inverted position;

Fig. 3 is a vertical section similar to Fig. 2, but showing the applicator pressed against the skin surface and the bottle in an upright but tilted position;

Fig. 4 is an elevation of the upper portion of a bottle containing the applicator and having a closure cap attached thereto, the closure cap being shown in section;

Fig. 5 is a vertical sectional view of a modified type of dispenser for liquids made according to the invention;

Fig. 6 is a sectional view taken along line II—II of Fig. 5;

Figure 7 is a sectional view of the upper portion of the dispenser shown in Fig. 1, wherein, however, the closure cap is removed and the applying membrane is in the position which it occupies during the application of liquid to the body; and

Fig. 8 is a vertical sectional view of the upper portion of another modified form of dispenser made according to the invention.

Price 2s.

Price 4s. 6d.  
Price 5s. 0d.

As shown in Figs. 1 and 2, the applicator insert comprises a body portion 10 preferably made of a thermo-plastics material. The body portion 10 is initially moulded integrally in the form shown in Fig. 1 and constitutes a lower tubular portion 12 closed off at its top by a transverse wall 14. The wall 14 has an upstanding integral annular rib 16 which is of reduced thickness at its upper end. Extending outwardly from the rib 16 is an integral extension 14a of wall 14 which terminates in an upstanding outer flange 18. The extension 14a projects outwardly of the central depending tubular portion 12 and defines a transverse shoulder 20. The transverse wall 14 has a central through aperture or opening 22 which is also centred within the depending tube 12.

In assembling the applicator insert, a circular disc 24 of porous material is inserted within the chamber formed between the wall of the upstanding annular rib 16. The disc 24 is sized to fit snugly within the rib 16, and is made of a flexible material, preferably a plastics foam. It has been found that best results are obtained from the use of that plastic known commercially under the trade-name, "Neoprene." The disc 24 is liquid permeable and is capable of being saturated for retention of the liquid, in the manner of a sponge, thereby serving in the applicator as a liquid retaining inlay from which the liquid is dispensed during use of the applicator, as will be presently described in greater detail.

After the inlay or disc 24 has been inserted in position, the thin upper portion of the upstanding rib 16 is heated and bent or peened over to provide a peripheral top bight 26, as shown in Fig. 2. This top bight 26 overlies the marginal edge of the disc 24 and retains said disc securely in its seated position in the central chamber formed by the annular rib 16, the disc 24 lying flush against the transverse wall 14.

In the further assembling of the applicator, a larger circular disc 28 is placed across the top of the insert body portion 10 and its outer circumferential portion is bent downwardly and inserted into the channel 30 formed between the inner annular rib 16 and outer flange 18, and closed at its bottom by the wall extension 14a.

The upper portion of the flange 18 is then heated and peened over to form a top bight 32 which grasps the marginal portion of the disc 28 and securely holds the latter in its mounted position.

The disc 28 is preferably made of the same material as the disc or inlay 24, that is, of Neoprene foam, so that it is flexible, resilient, absorbent and capable of being saturated. In this connection, the disc 28 acts as an applicator membrane through which the dispensed liquid may pass for dis-

tribution to the skin surface by direct application of the outer surface of the disc or membrane 28 to said skin surface.

It will be observed that the bight 26 formed in the rib 16 provides an airtight and liquid tight seal around the circumference of the disc or inlay 24, while similarly, the bight 32 in flange 18 forms a seal around the circumference of disc or membrane 28. The insert body 10 is thus sealed against leakage of the liquid there-through, with the exception of the controlled liquid which will penetrate the porous bodies of discs 24 and 28 for selective application to the skin.

In addition, it will be noted in Fig. 2 that the top bight 26 of the inner annular rib 16 projects above the top surface of the disc or inlay 24. The bight 26 thus also acts as a spacer element, causing the outer disc or membrane 28 to assume a convex shape and providing an air space 34 between the lower surface of disc 28 and the upper surface of disc 24. The discs 24 and 28 are thus normally spaced from each other by the air space 34.

The assembled insert is intended to be used in connection with a liquid container, for example the bottle 40. The bottle 40 has a threaded neck 42 and is intended to hold a quantity of liquid 44 to be dispensed, for example a liquid deodorant, cologne, shaving lotion, or the like. The depending tubular portion 12 of the insert body 10 is sized to be press-fit within the neck of the bottle 40 with the projecting shoulder 20 overlying the mouth of said bottle, as shown in Fig. 2. The lower end portion 36 of the depending tubular insert portion 12 is moulded with a downwardly-decreasing diameter and is made of lesser thickness than the remainder of the insert body so as to have an increased flexibility. This shaping and dimensioning of the lower portion 36 facilitates the ready insertion of the tubular insert portion 12 within the bottle neck. The remainder of the tubular insert portion 12 has a sufficient diameter to fit tightly within the bottle neck, once inserted so that it may be only forcibly removed.

In the use of the applicator, the bottle 40 is initially tilted and the outer porous disc or membrane 28 pressed against the skin surface to which the liquid is to be applied. As shown in Fig. 3, such pressure of the membrane 28 against the skin surface S, causes the flexible membrane 28 to bend inwardly until it is pressed against the inner disc or inlay 24. Pressure of the outer disc 28 against the inner disc 24, squeezes liquid from the latter, which liquid is absorbed in, and passes through the disc 28 to the outer surface thereof, from whence it is applied to the skin surface S. As the outer disc or membrane 28 is pressed against the skin

surface S, it is also drawn along the skin surface in a rubbing or wiping stroke, so that the liquid transferred to the membrane 28 is distributed to the skin in a fine film or layer.

In application of the liquid, the bottle 40 is normally held in an inclined or inverted position so that the liquid 44 therein is in contact with the transverse wall 14 and its opening 22. In applying the wiping application strokes to the skin surface, the outer disc or membrane 28 alternately compresses the inner disc or membrane 24 and returns to its position spaced from the inlay 24 performing a pumping action, which will presently be explained, and drawing liquid through the opening 22 to maintain the inner disc or inlay 24 in a saturated or partially saturated condition. The liquid is thus distributed to the skin in an extremely controlled manner, since no more liquid can pass through the outer disc or membrane 28 than can be absorbed and held by the saturated inner disc or inlay 24. The normal manner of manipulating the bottle during application is to wipe the outer disc or membrane 28 against the skin surface in a succession of strokes in the same direction. That is to say, the membrane 28 is wiped in one direction along the skin surface, is then lifted, and brought back to approximately its original position, and is then wiped in a succeeding stroke in the same direction. When the applicator is lifted from the skin surface between strokes, the outer membrane or disc 28, because of its resilience, assumes its original convex shape in which it is spaced from the inner disc or inlay 24, again forming the air space 34. A vacuum or low pressure area is thus created in the space 34 because of the previous compression of the disc 24, and liquid is thus drawn through the aperture 22 into the porous disc 24, causing the latter to again become saturated for the next application stroke. The discs 24 and 28, in operation of the applicator, thus operate as a membrane pump for drawing small amounts of the liquid through the single aperture 22 to replenish the porous disc or inlay 24. This pump operation is made possible when the bottle 40 is held in a horizontal or downwardly inclined position during application, with the liquid 44 in contact with the aperture 22.

A particular advantage of the applicator is its ability to be used with the bottle in an upright position, as shown in Fig. 3, as, for example, in the application of a liquid deodorant beneath the arms. In this connection, the porous inner disc or inlay 24 is capable of absorbing sufficient liquid to provide an effective application of the liquid to the skin when the bottle is in upright position. On the other hand, the inlay 24 is made

small and of relatively small width so as to avoid too great a supply of liquid from being transferred to the outer membrane 28, and consequently avoiding dripping or uncontrolled application of the liquid.

For use in dispensing liquids of various physical properties, the applicator may be modified by simply varying the relative thicknesses of the porous discs 24 and 28. Some liquids to be dispensed, for example, may be of relatively greater viscosity or may be less capable of absorption in the porous discs than others. In such an event, the outer disc or membrane 28 may be made of relatively lesser thickness so as to be more readily permeable by the liquid. It may also be desirable to make the outer disc or membrane 28 of appreciably greater thickness than the inner disc or membrane 24. In such an event, greater pressure is required to press the outer disc 28 inwardly from its normal convex shape into engagement with the inner disc or inlay 24, and this added pressure has the effect of distributing a greater amount of liquid to the skin surface with each application stroke.

If desired, a thin sheet of knitted or woven fabric 38 may be used to cover over the outer surface of the disc or membrane 28. This fabric sheet 38 is originally inserted over the disc 28 and is held at its outer edges by the peened over bight 32 of the flange 18. The fabric sheet 38 provides a smooth applicator surface which may be desirable in some instances for rubbing application against the skin surface, and may be made of a tough synthetic fabric which has abrasion resistance to prevent wear on the applicator membrane.

The bottle 40 is provided with a closure cap 46, shown in Fig. 4, having internal threading 48 for attachment to the externally threaded bottle neck 42. The inner surface of the cap top wall is provided with a central concavity 50 bordered by a shoulder 52. When the cap 46 is screwed to its mounted position, the outer disc or membrane 28 and its fabric covering 38 are contained within the concavity 50, while the shoulder 52 makes firm contact with the top surface of the insert bight 32 and thereby provides an air-tight seal around the membranes 28. After use, the applicator may thus be tightly sealed by insertion of the cap 46, and the membrane 28 and inlay 24 will remain moist and ready for the next application.

When the applicator is not in use, the air space 34 prevents the liquid from contacting the outer membrane 28. The applicator and bottle may be laid on its side and even inverted, but the inlay 24, once having become saturated, will not absorb any further liquid, and the liquid will not drip out of the inlay 24 and cross the air space 34 to

the outer membrane 28. Thus, even after storage in an inclined or inverted position, the membrane 28 will not contain an over supply of liquid and will always be ready for efficient use in applying a controlled layer of liquid.

The provision of the single opening 22 in the transverse wall 14 prevents liquid from flowing through the wall 14 into contact with the inner disc or inlay 24 when the applicator is stored or shipped in a horizontal position. This is of importance in those instances in which, in manufacture, the porous inlay 24 is cut so thin that one of its cells may have a through hole therein. The use of a single opening 22 prevents the liquid, in shipment or storage, from flowing into the inlay 24 and through its hole into the air space 34. When the dispensing means is used for applying liquid the inlay is compressed as shown in Fig. 3, closing up its through hole and preventing direct flow of the liquid therethrough.

In addition, the single central wall opening 22 compensates for pressure formed within the bottle by volatile liquids. With such volatile liquids as those containing essential oils and alcohols, gas forming within the bottle would tend to compress the edge regions of the inlay 24 against the rigid portion 26 of the applicator body, thus squeezing liquid into the air space 34. This tendency is overcome, however, by locating the single wall opening 22 at the centre of the inlay 24, so that gas pressure acting through said opening 22 will merely lift the inlay slightly at its centre, at which it is spaced from the annular rib 16, and hence the edge regions of the inlay are not compressed against the portion 26.

A modified form of dispenser 110 for liquids comprising a container 112 having a threaded neck portion 114 is shown in Figs. 5, 6 and 7. A hollow member, generally indicated by 116, tightly inserted into the bore of the neck 114 comprises a bottom 118, a cylindrical wall 120, four inwardly projecting elements 122 and annular top element 124. The elements 122 are shorter than the cylindrical wall 120, so that a chamber 126 is formed inside the member 116 between the upper end of the elements 122 and the lower surface of the annular top element 124. Said chamber 126 communicates with the interior of the container or case 112 through bores 128 extending through the elements 122.

A cylindrical body 130 inserted into the cavity of the member 120 is held therein by means of the protruding elements 122. Said body 130 is made of an elastic porous mass, preferably of a foam material such as foam plastics or "Neoprene", and acts as a porous reservoir member or inlay.

An applicator membrane 132 engaged

with a slot 134 of the top element 124 of of the member 120 is likewise made of an elastic porous material, preferably a foam material made of so-called "Neoprene". The inner edge 136 of the top element 124 is somewhat higher than the upper surface of the body or porous reservoir member 130, whereby a space 138 is formed between the body 130 and the membrane 132.

A threaded cap 140 may be screwed on the threaded neck 114 of the case 112 for closing the aperture thereof.

The dispenser may be used as follows:—

The container 112 is filled with a liquid, for example, deodorant, perfume, liquid lipstick, liquid rouge or lotion. When the dispenser is carried around, for example in a pocket-book, owing to the shaking of the pocket-book liquid flows from the interior of the container 112 through the bores 128 into the chamber 126 of the member 120 and thence into the porous body 130. Thus the body or porous reservoir member 130 absorbs a certain amount of the liquid. If the dispenser should not have been carried around in a pocketbook, the same effect may be obtained by manually shaking the dispenser before use.

Now when after removal of the cap 140 the dispenser is used and its porous membrane 132 is pressed against the skin of the body, said membrane 132 obtains the concave shape as shown in Fig. 7. Thereby the porous membrane 132 comes into contact with the upper surface of the porous reservoir body or inlay 130 so that a controlled or predetermined amount of liquid contained therein is pressed through the porous membrane 132 onto the outer surface of the latter for application to the skin.

The amount of liquid to be applied to the skin can be readily regulated by pressure exerted during the application of the liquid. The higher the pressure, the more liquid will be applied to the skin. The desired pressure can be predetermined by choosing a certain distance between the body 130 and the membrane 132 and/or by selecting a certain thickness of the membrane 132. Furthermore the density of the foam material of the body 130 and/or the membrane 132 will have a controlling influence on the amount of liquid to be applied to the skin during each application.

It will be readily understood from above, that the dispenser according to the invention eliminates the discharge of uncontrolled amounts of liquid during the application and that such a suppression of the discharge of uncontrolled amounts could not be obtained if the body 130 filled with liquid would be applied directly to the body of a person.

Furthermore the outlet of the dispenser according to the invention is tightly sealed

when not in use. The space 138 left between the membrane 132 and body or porous reservoir member 130, normally filled with air, prevents an escape of the liquid absorbed by the body 130 from the latter.

The embodiment shown in Fig. 8 is similar to the embodiment shown in Fig. 3. However the porous membrane 132 of the dispenser of Fig. 7 is replaced by a member 248 made of an elastic but non-porous material. Said member or membrane 248 being provided with a series of holes 250 is firmly engaged with a slot 234 of the member 216 inserted into the bore of the neck 214 of the case 212.

When the flexible membrane 248 is applied to the skin of a person, it is bent inwardly for engagement with the wet body 230, from which a predetermined amount of liquid is pressed through the bores 250 of the membrane 248 onto the skin of the person. The amount of liquid to be applied to the skin during an application can be predetermined by choosing a certain number of holes of a certain size in the member 248. For example, whilst the specification and claims refer to application upon a "skin" surface, the use of such term is intended to include any surface upon which the applicator is suitable for use to apply a controlled quantity of liquid, and may include leather, metal or the like.

#### WHAT I CLAIM IS:—

1. A dispensing means comprising a porous reservoir member adapted to be mounted on a container and adapted to be saturated with liquid therefrom, a flexible, resilient and liquid permeable applicator membrane, which is mounted in spaced, confronting relation to the reservoir member, being adapted to be depressible into abutment with the reservoir member upon application of the dispensing means to a surface.

2. A dispensing means as claimed in claim 1 in which the applicator membrane is sufficiently flexible to return to its position spaced from the reservoir member when the dispensing means is lifted from its depressed position in engagement with the surface.

3. A dispensing means as claimed in claim 1 or 2 in which the reservoir member is flexible and the applicator membrane is porous.

4. A dispensing means as claimed in claim 1, 2 or 3 comprising a body including a depending tubular portion adapted to fit snugly within the container neck, a transverse wall extending across the top of the tubular portion and having a single opening therein, the porous reservoir member resting on the outer surface of the transverse wall and covering the opening.

5. A dispensing means as claimed in any preceding claim in which both the reservoir member and the applicator membrane are disc-shaped.

6. A dispensing means as claimed in claim 4 in which the body also includes means for mounting the applicator membrane and the reservoir member, the mounting means providing an air-tight seal around the marginal edges of the applicator membrane and reservoir member, the applicator membrane in pressing against the reservoir member compresses the latter and acts as a membrane pump to form a vacuum within the reservoir member and in the space between the reservoir member and applicator membrane.

7. An applicator means as claimed in claim 4 or 6 in which an inner wall is upstanding from the transverse wall and defines a central chamber in communication with the transverse wall opening, the reservoir member being contained within the central chamber, the top end of the inner wall having a bight engaging the marginal edge of the reservoir member and forming an air-tight seal therearound, an outer wall upstands from the transverse wall and is spaced outwardly from the inner wall, the applicator membrane being mounted above and extending over the reservoir member in normally spaced relationship thereto, the top end of the outer wall having a bight engaging the marginal edge of the reservoir member and forming an airtight seal therearound, the bight of the inner wall extends above the top surface of the reservoir member and maintains the applicator membrane normally spaced above the reservoir member.

8. An applicator means as claimed in claim 7 in which the transverse wall projects outwardly of the depending tubular portion forming a shoulder on the body, the shoulder being positioned to engage the top surface of the container neck when the body is inserted therein.

9. A container assembly comprising in combination, a container capable of holding a supply of liquid and having an externally threaded neck, an applicator means as claimed in any preceding claim and adapted to close off the neck of the container and a closure cap for the container, the closure cap being internally threaded for removable mounting on the container neck and being sized to cover the applicator means in its mounted position.

10. A container assembly as claimed in claim 9 in which a portion of the applicator body member projects laterally outwardly from the edge of the applicator membrane, the closure cap having an inner concavity sized to receive the applicator membrane therein and an inner shoulder bordering the concavity, the shoulder being posi-

tioned to abut the laterally projecting portion of the applicator body member for providing a seal around the applicator membrane in the mounted position of the closure cap.

5

11. A dispensing means constructed and arranged to operate substantially as herein-described with reference to and as illustrated in Figs. 1 to 4 of the accompanying

10 drawings.

12. A dispensing means constructed and

arranged to operate substantially as herein described with reference to and as illustrated in Figs. 5 to 7 of the accompanying drawings.

15

13. A dispensing means constructed and arranged to operate substantially as herein described with reference to and as illustrated in Fig. 8 of the accompanying drawings.

POTTS & CO.,

Chartered Patent Agents,  
24, Moorfields, Liverpool, 2.

Sheerness: Printed for Her Majesty's Stationery Office, by Smiths, Printers and Duplicators.—1960.  
Published at the Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.

FIG. 1.

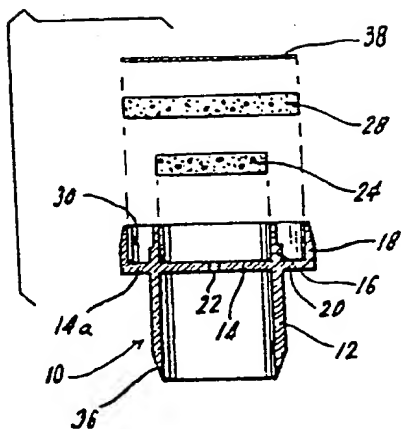


FIG. 4.

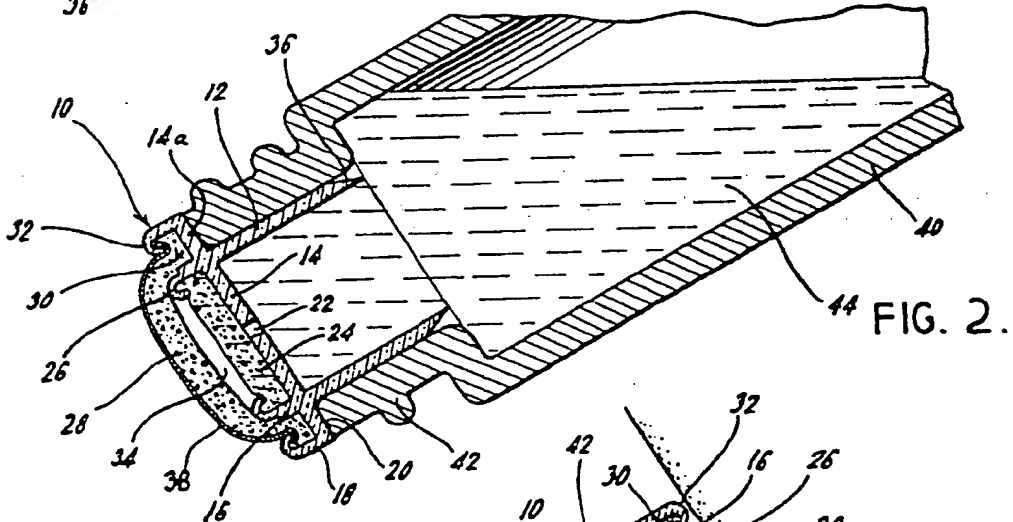
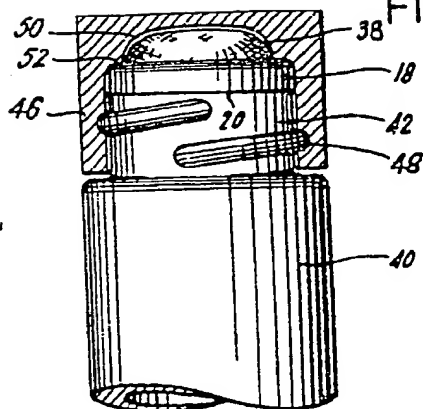
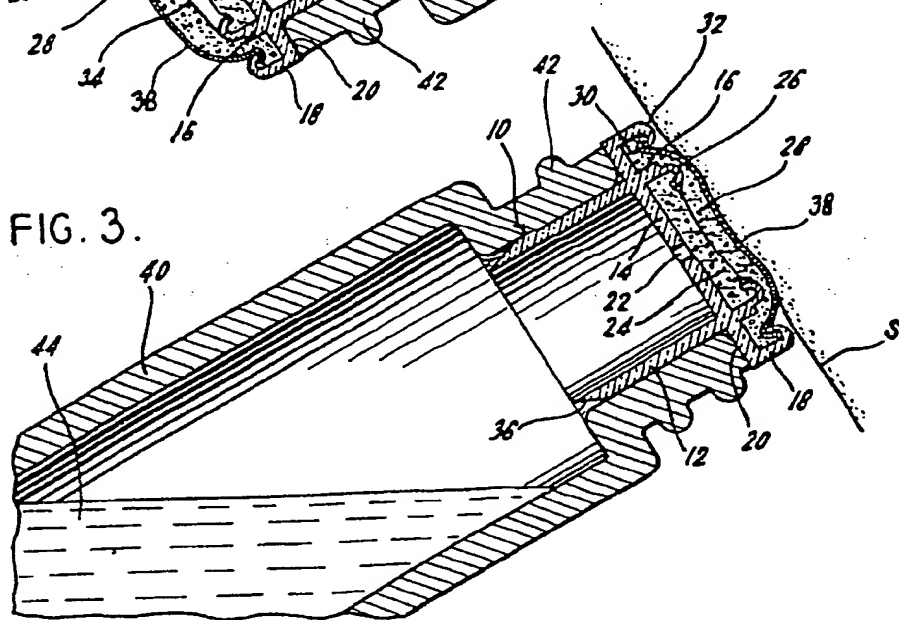


FIG. 3.



838,800

2 SHEETS

# COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.  
SHEETS 1 & 2

FIG. 4.

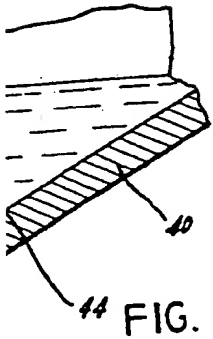


FIG. 2.



Fig. 5.

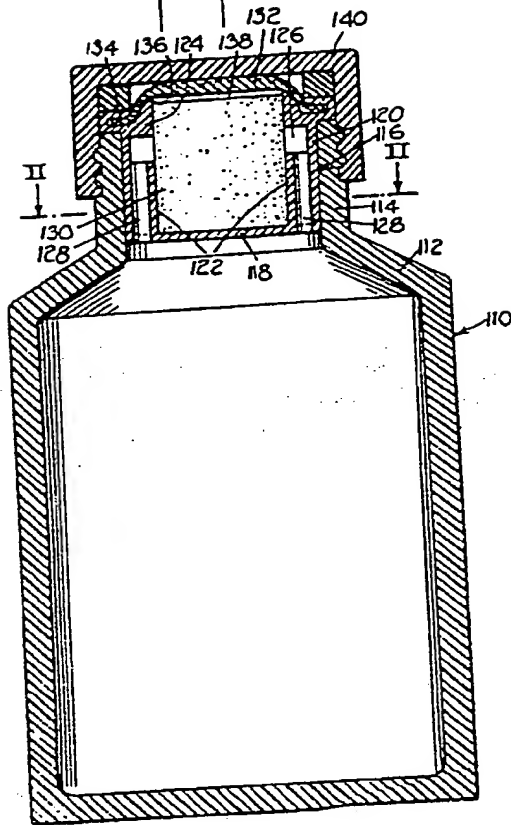


Fig. 7.

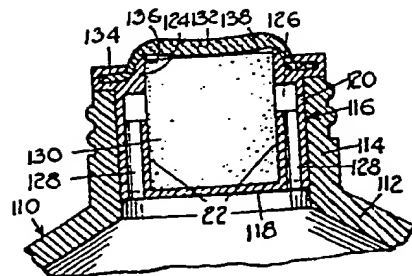


Fig. 6.

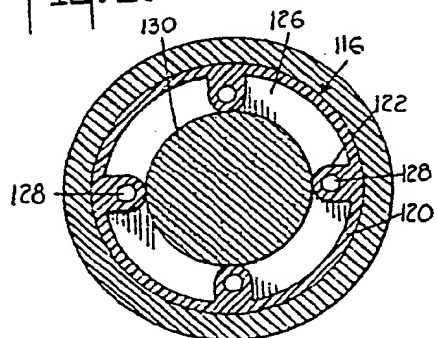


Fig. 8.

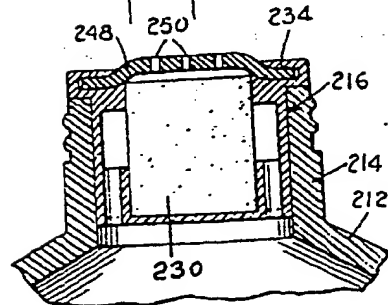




FIG. 1.

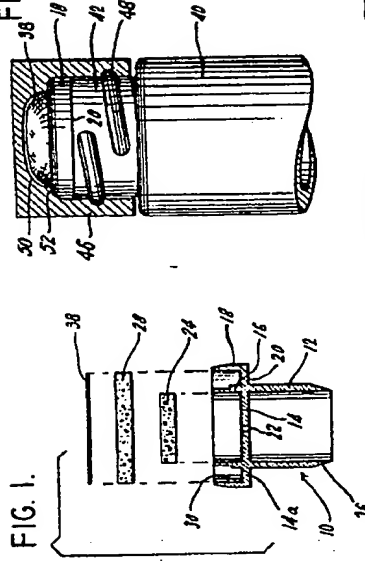


FIG. 2.

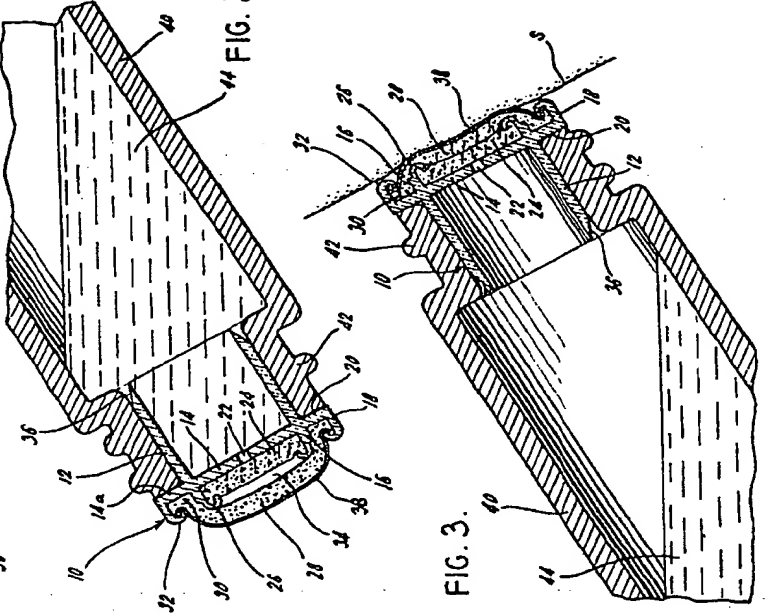


FIG. 3.

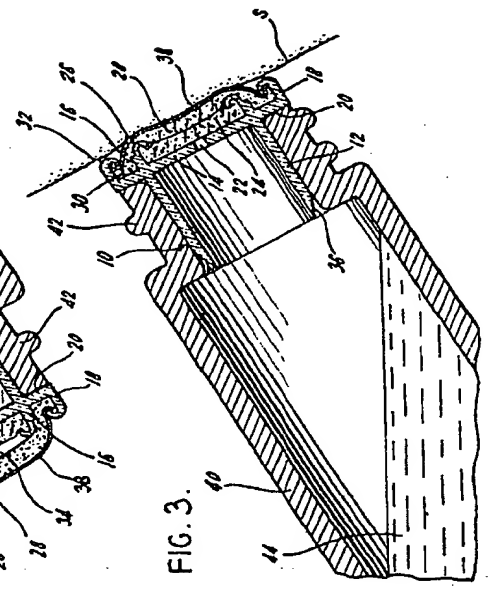


FIG. 5.

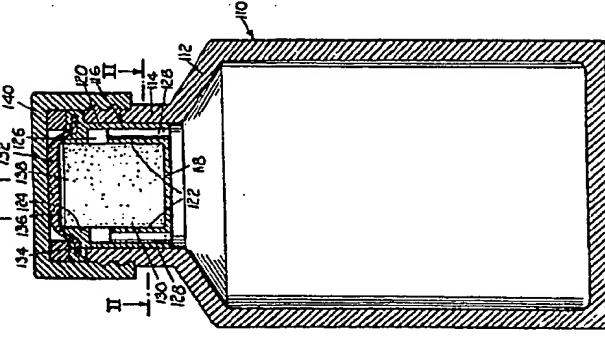


FIG. 7.

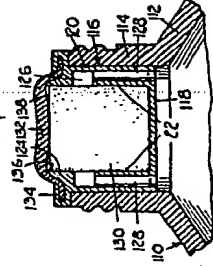


FIG. 8.

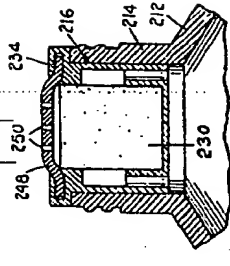


FIG. 6.

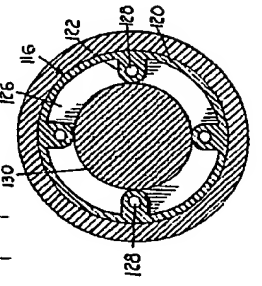




FIG. 1.

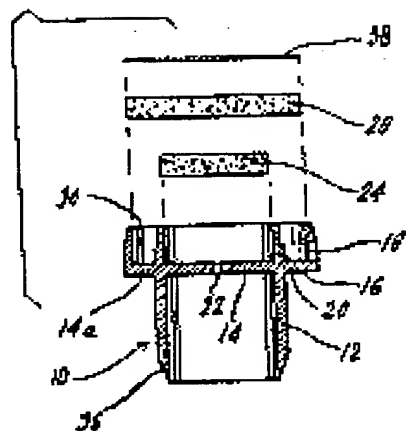


FIG. 4.

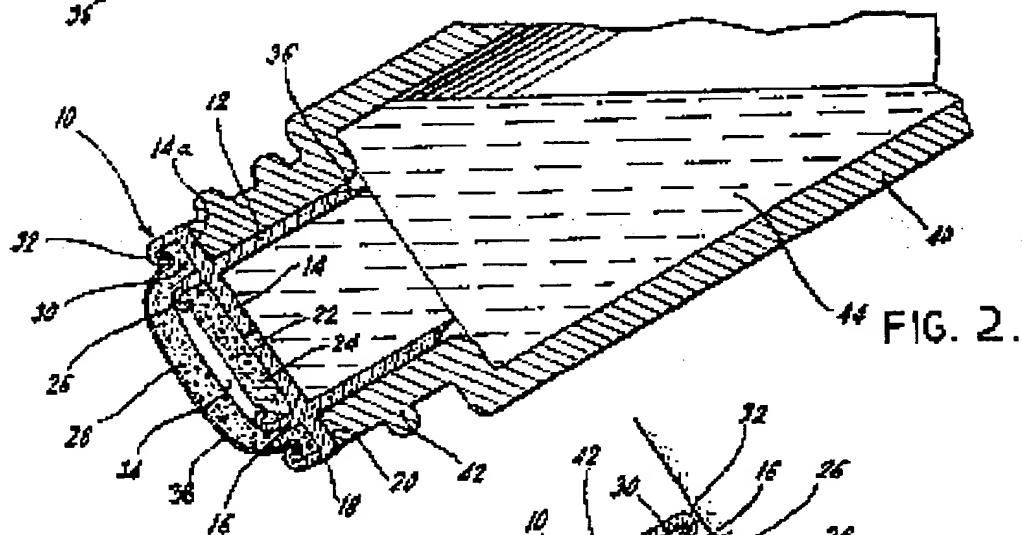
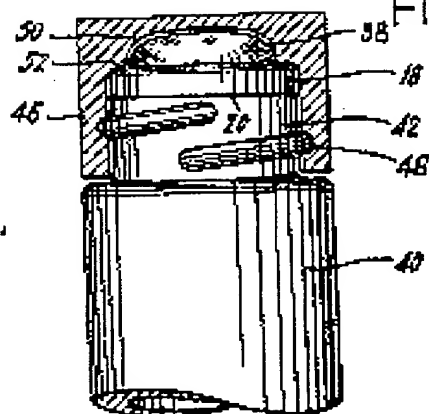
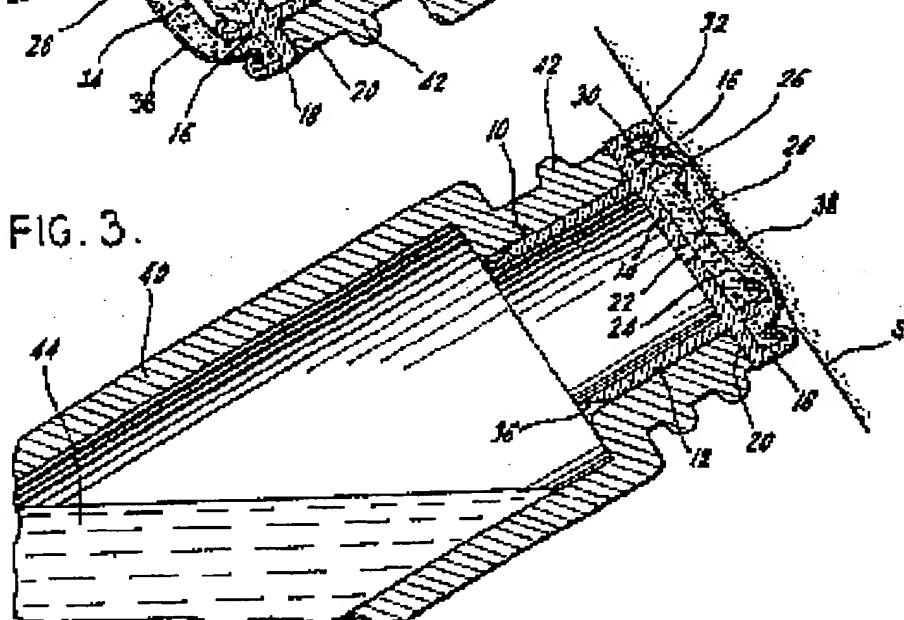


FIG. 3.



838,800  
2 SHEETS

COMPLETE SPECIFICATION  
This drawing is a reproduction of  
the Original on a reduced scale.  
SHEETS 1 & 2

FIG. 4.



Fig. 5.

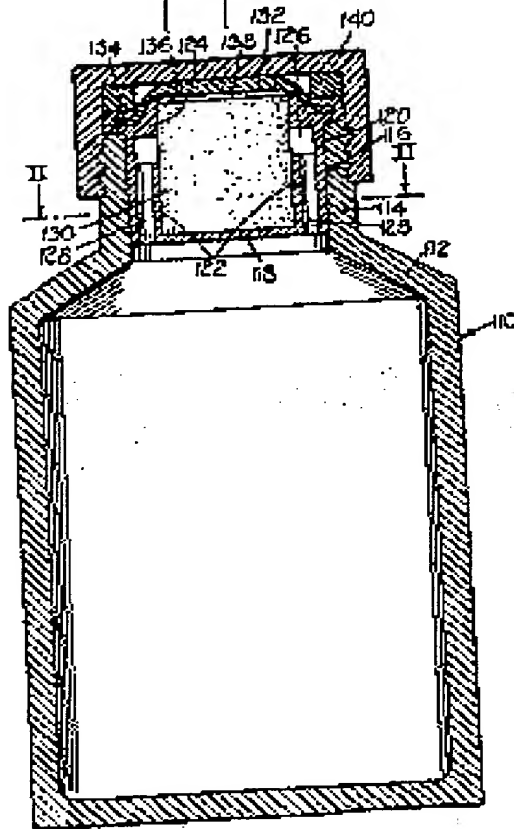


Fig. 7.

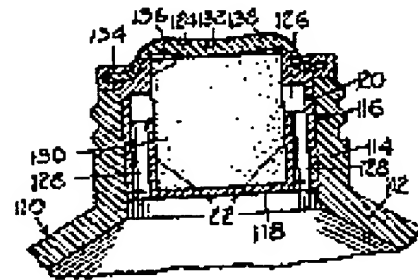


FIG. 2.

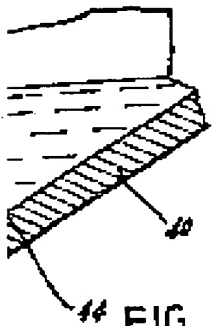


Fig. 6.

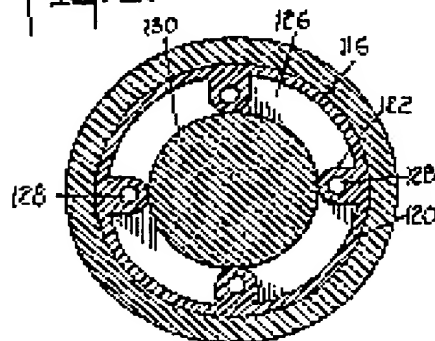


Fig. 8.

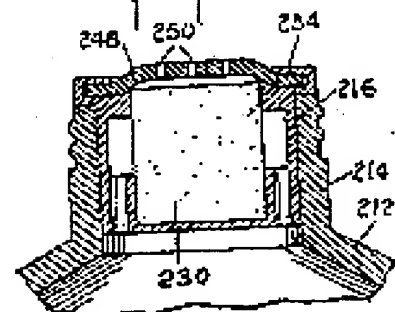


FIG. 1.

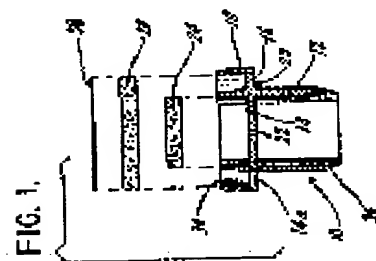


FIG. 4.

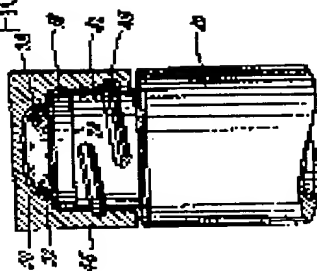


FIG. 2.

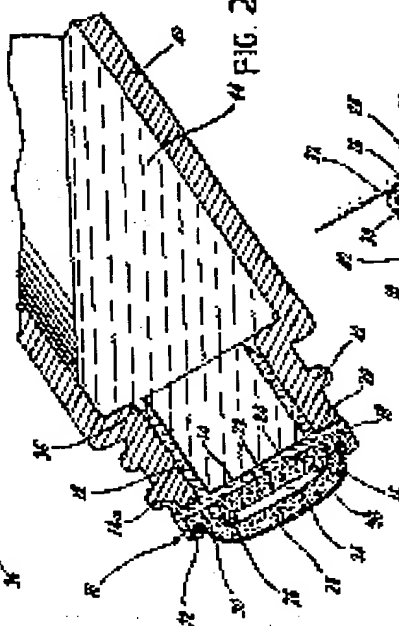


FIG. 3.

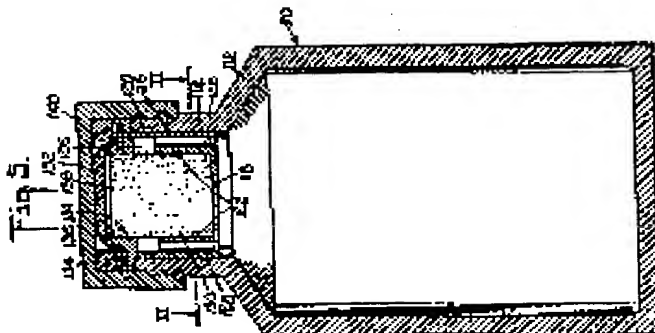
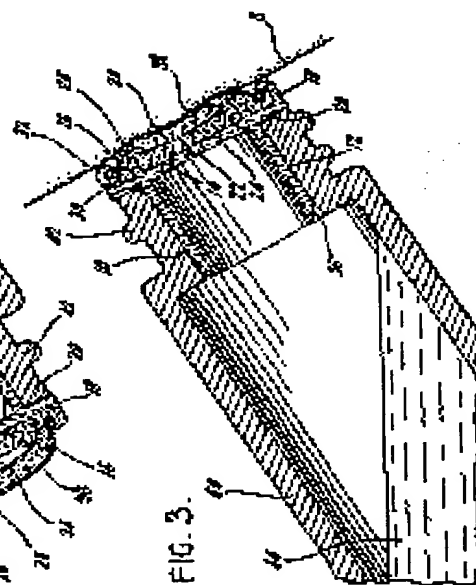


FIG. 7.

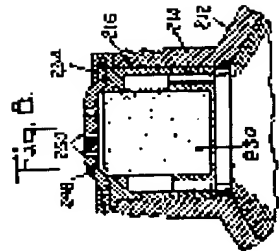
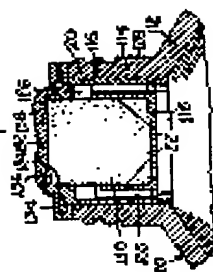


FIG. 6.

